FLNG SUB 43

AUSTRALIAN CENTRE FOR ENERGY AND PROCESS TRAINING (ACEPT)

ACEPT
Australian Centre for Energy and Process Training

RESPONDING TO THE FUTURE NEEDS OF THE OIL AND GAS INDUSTRY

MARCH 2013

Challenger
INSTITUTE OF TECHNOLOGY

SUMMARY

The rapid growth of the Australia's LNG industry is expected to place severe stress on the labour market for skilled production operators. The number of LNG plants across the country is expected to increase from three to eight, and Australia's LNG production is expected to grow from the current 24mtpa to over 100mtpa, or five times the existing level of production. It is predicted that 6000 additional people will be needed in the operations phase with approximately 3000 additional process operators and 1500 additional instrumentation and maintenance workers required by 2017-18.

The Australian Centre for Energy and Process Training (ACEPT), located at Henderson, Western Australia, provides training and workforce development services for the oil and gas industry. It is the only facility of its kind in the southern hemisphere and features a distillation tower and a closed loop processing plant controlled by a Honeywell distributed control system.

To service the emerging and future workforce development needs of the Australian LNG industry, a two phase expansion of ACEPT is proposed, at a total cost of $14 million. Equal (one third) funding is sought from the Commonwealth, WA state government and industry.

Phase 1 can be implemented within six months and will double ACEPT's capacity to train process operators from 900 to 1800 per annum. It is proposed to provide remote access to ACEPT's physical and simulated training infrastructure and expertise, in order to improve accessibility and support the establishment of complementary training strategies with the Northern Territory and Queensland thereby providing a sustainable national training strategy. The estimated cost of implementing a remote access model is $500,000. Industry funding-support for Phase 1 has been agreed in principle.

In Phase 2, the proposal is to create an Operations Centre of Excellence at ACEPT. An applied engineering training centre would be co-located on the existing site to extend ACEPT's scope to include high-level skills in process operations, electrical/instrumentation control, engineering technicians and plant maintenance skills.

Phase 2 would double ACEPT's capacity to more than 3000 students per annum, and increase ACEPT's capability to meet the future workforce development needs of the Australian LNG industry to include not only process operators but also electrical / instrumentation control engineers and engineering technicians.

BACKGROUND

Challenger Institute of Technology's Australian Centre for Energy and Process Training (ACEPT) provides training and workforce development services for the oil and gas industry. It is the only facility of its kind in the southern hemisphere and

features a distillation tower and a closed loop processing plant controlled by a Honeywell distributed control system. ACEPT also supports Honeywell, Yokogawa and Emerson Delta V process train simulators for LNG and oil and gas operations.

ACEPT provides its students with unique access to a functional processing plant for training that includes an operational control centre that replicates and develops industry work practice and culture. With access to operational plants currently limited, the hands-on learning environment at ACEPT is valuable and unique amongst oil and gas training providers.

ACEPT works closely with industry partners to provide world class facilities and a comprehensive range of workforce development services. It is governed by an active and strategically focused Industry Advisory Board of representatives from leading companies including Woodside, Shell, Inpex, Chevron, Conoco Phillips and Apache. Ex-Woodside Chief Operating Officer, Mr Keith Spence, chairs the Board.

The core client group for ACEPT is process operators working in the oil and gas and resource sectors. ACEPT provides training programs from entry level to associate professional level that are validated by industry to ensure they meet the required standards for new entrants and existing workers. Strong industry partnerships contribute to maintaining the industry currency of ACEPT's physical and technology infrastructure, whilst ongoing collaboration with technical experts from ACEPT's industry partners maintains the industry currency of trainers. ACEPT staff work closely with industry sponsors and community agencies to increase the participation and success of under-represented groups in the oil and gas workforce. Programs such as the "Women in Engineering" partnership with Chevron have been recognised as innovative and best practice for increasing the participation of women in the oil and gas industry.

With several new LNG projects entering the operational phase over the next few years, demand for highly skilled operators to operate and maintain plant safely and efficiently, will increase dramatically. In order to meet this growing demand and continue to support the workforce development needs of the Australian LNG Industry as it moves into the operational phase, ACEPT will require enhancements to its physical and virtual training infrastructure.

The rapid expansion of the Australia's LNG industry is expected to place severe stress on the labour market for skilled production operators. It is anticipated that in the short term, the number of operating LNG plants across the country will shortly increase from three to eight. Total current production from the three operating LNG plants (North West Shelf, Pluto and Darwin) is approximately 24mtpa. The Gorgon, Wheatstone, Icthys, Browse, Prelude FLNG, APLNG, GLNG and QCLNG projects will add a further 80mtpa bringing total Australian LNG production capacity to over 100mtpa or five times the existing level of production.

It is predicted that there will be a need for 6000 additional people in the operations phase with approximately 3000 additional process operators and 1500 additional

instrumentation and maintenance workers required by 2017-18; see Figure 1 and Figure 2 below:

Figure 1

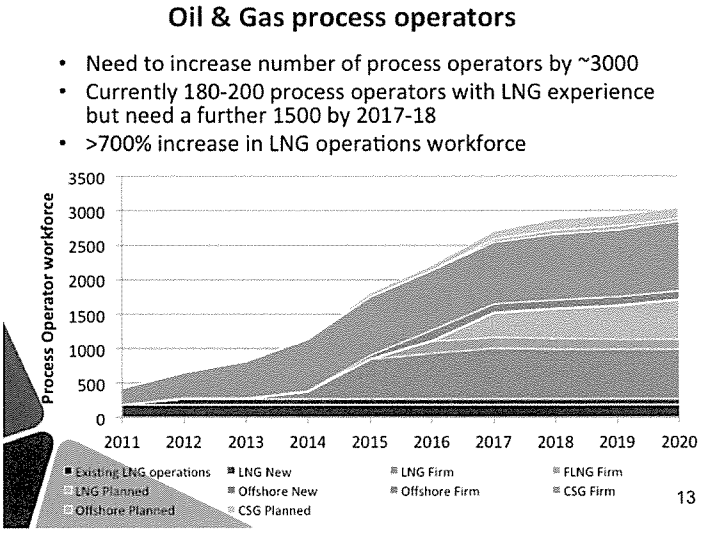
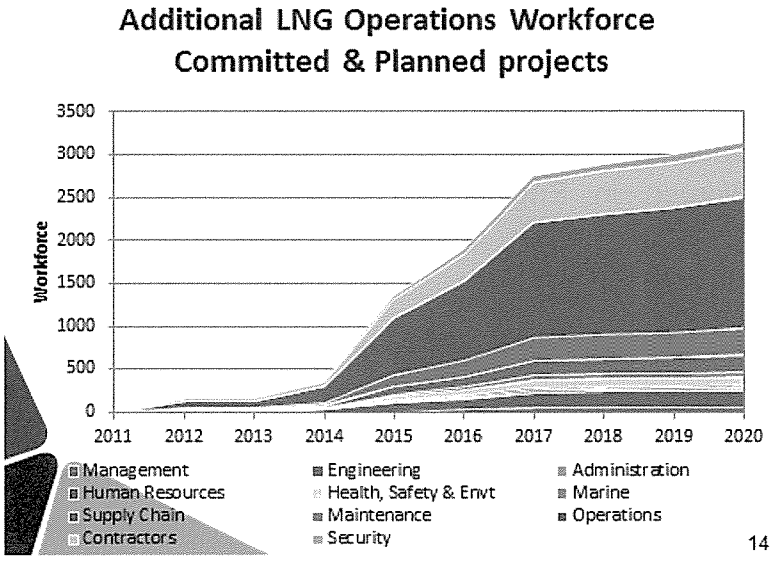


Figure 2



Reference: Australian Oil and Gas Technology Conference July 2012, Skills requirements for the Oil and Gas sector growth presented by Mr Keith Spence.

RESPONDING TO FUTURE WORKFORCE DEVELOPMENT NEEDS

To service the workforce development needs of the Australian LNG industry as it moves into the operational phase ACEPT will require enhanced physical and technology infrastructure and continued sharing of expertise with oil and gas companies to maintain sufficient numbers of industry current trainers.

It is proposed that the next phase of ACEPT's infrastructure development should include the following 2 projects:

- **Project 1 - Remote Access** (See Attachment 1): Enhancing learning systems and technology infrastructure to provide remote access to ACEPT's physical and simulated training infrastructure and expertise. This infrastructure will improve accessibility and support the establishment of complementary training strategies with the Northern Territory and Queensland to provide a sustainable national training strategy. Remote access capability will increase ACEPT's capacity to provide more flexible international services when working with global companies.

- **Project 2 – Applied Engineering Training Centre** (See Attachment 2): Building an applied engineering training centre co-located on the existing site will extend ACEPT's scope to include high level skills in process operations, electrical / instrumentation control, engineering technicians and plant maintenance skills. The co-location will provide engineering students with an applied LNG learning environment that will incorporate hands-on practical experience on ACEPT's closed loop processing plant.

The combined cost of both infrastructure projects is approximately $14 million with cost estimates for Project 1 at $500,000 and for Project 2 at $13.5 million. The proposed infrastructure projects will support significant growth in ACEPT's capacity from 900 student enrolments per annum to more than 3000, and increase ACEPT's capability to meet the future workforce development needs of the Australian LNG industry to include not only process operators but also electrical / instrumentation control engineers and engineering technicians; see Table 1 and Table 2 below:

Table 1

Plant Process Operations Capacity

Occupation	Qualification Pathway	Current ACEPT Capacity	Proposed ACEPT Stage 2 Capacity
Field Operator	PMA20108 Certificate II in Process Operations	173	323
Panel Operator	PMA40108 Certificate III / IV in Process Technology	290	609
Supervisor	PMA60108 Diploma / Advanced Diploma Process Plant Technology	121	266
Control Room Technicians	PMA50108 Diploma Process Plant Technology	New	200
Production Technicians	PMA50108 Diploma Process Plant Technology	New	290
Production Coordinator	PMA60108 Advanced Diploma Process Plant Technology	New	121
Laboratory Assistants	PMA20108 Certificate II in Process Operations	New	42

PATHWAYS FOR PROCESS PLANT OPERATIONS

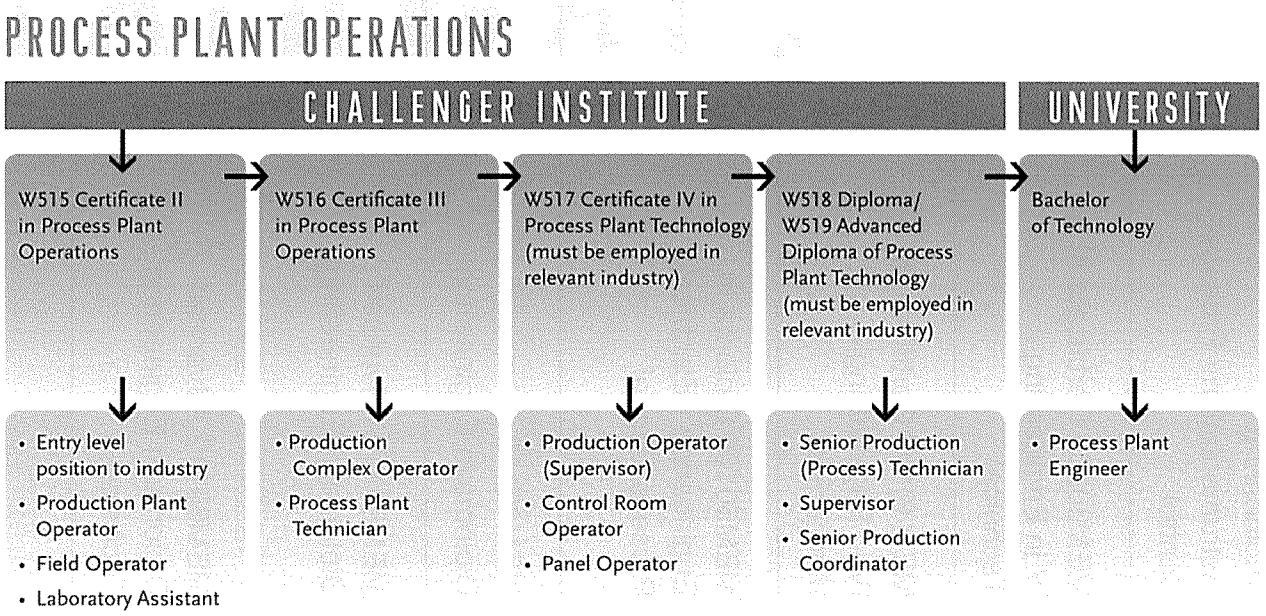
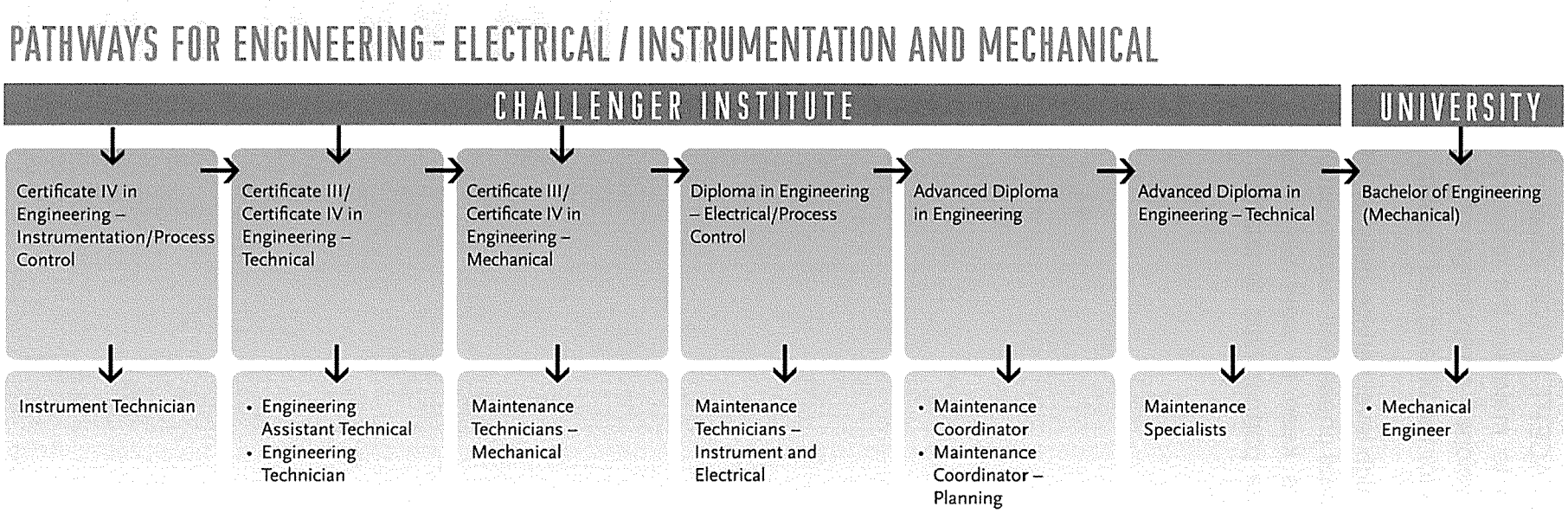


Table 2

Instrumentation Maintenance and Engineering Capacity

Occupation	Qualification Pathway	Current ACEPT Capacity	Proposed ACEPT Stage 2 Capacity
Instrumentation Electrician	MEM40105 Certificate IV in Engineering - Instrumentation / Process Control	138	345
Engineering Technician	MEM30505 Certificate III / IV in Engineering - Technical	75	225
Maintenance Technicians - Mechanical	MEM40105 Certificate III / IV in Engineering - Mechanical	22	66
Maintenance Technicians – Instrument and Electrical	MEM50105 Diploma in Engineering - Electrical / Process Control	New	238
Maintenance Coordinator	MEM60112 Advanced Diploma in Engineering	New	75
Maintenance Coordinator - Planning	MEM60112 Advanced Diploma in Engineering	New	75
Maintenance Specialists	MEM60112 Advanced Diploma in Engineering - Technical	New	160

PATHWAYS FOR ENGINEERING – MECHANICAL



OPPORTUNITIES FOR PARTNERS

Since the inception of ACEPT in 2006, Challenger Institute has worked closely with key industry partners to maintain the industry relevance of the training services provided and has developed a reputation of being a leading provider of workforce development services for the oil and gas industry.

Sustaining ACEPT's high level service delivery into the future, as major LNG projects move into an operational phase, will require extending ACEPT's scope and capacity. Challenger Institute is keen to work with industry and government partners to establish public-private partnerships to support the funding and implementation of the proposed projects.

Attachment 1

Project 1 - Remote Access

Building remote access capabilities to ACEPT will enable a flexible learning model that comprises three main components:

i) online access at any time (asynchronous) to learning materials (including 3D simulations) via an online learning management system;

ii) real time, remote access to ACEPT's processing plant control room and simulator. This will include a visual replication of the existing control systems, a voice link to the ACEPT control room that will allow remote students to issue work instructions to students at the ACEPT site and access to current plant camera systems that provide an overview of operations occurring within the process plant. This will give students an experience very similar to remote control environments in industry. Scenarios such as emergency responses will also be trialled as part of this remote access; and

iii) in person, onsite training and learning at ACEPT.

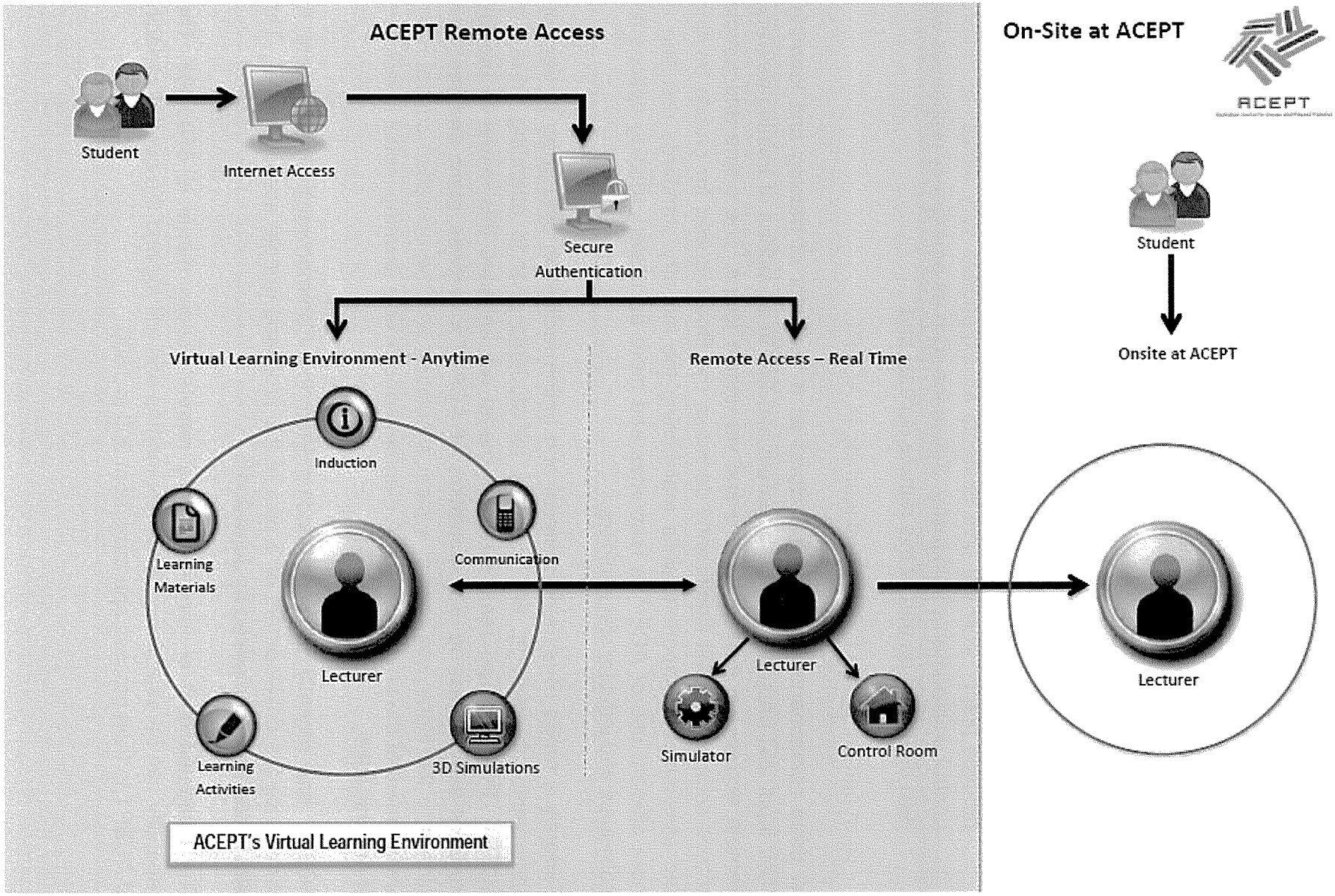
All three components involve the lecturer as a facilitator of training and learning. Their input and presence will be apparent and key in all modes of training delivery. Remote access will also be secure and via unique logins. The online and remote access components will significantly decrease the time required for on-site training and assessment component while maintaining the industry standards resulting in more efficient use of ACEPT's resources and more accessible training options for individuals and industry stakeholders.

Currently a range of learning material and online facilitation strategies, to develop underpinning knowledge, are available for students prior to attending on-site at ACEPT. The proposed remote access model will enhance this model to provide students with access to 3D simulation of ACEPT's process plant and real-time access to the Honeywell control system simulation and the operation control room environment of the physical plant. A diagrammatic flexible learning model is included at Attachment 1.

ACEPT has recently received funding from the Commonwealth government to commence the development of a pilot of the proposed remote access model. The pilot is due to be completed by June 2013.

The estimated cost of implementing a remote access model is $500,000. The capability can be established within six months and will expand the current capacity of ACEPT to train process operators from 900 to 1800.

Attachment 1 - ACEPT Remote Access Model



Attachment 2

Project 2 - Applied Engineering Training Centre

The applied engineering training centre would consist of a multi-level, multi-functional complex integrated with ACEPT's current training infrastructure. The co-location of the new centre with ACEPT, through easy access to ACEPT's process plant and lecturer's high level industry expertise, will provide students with a real workplace learning environment. The new centre would consist of general learning rooms, specialised training areas, computer based learning rooms, state-of the-art industry simulation suites and staff support spaces totalling a gross floor area of approximately 2,275m^2.

ACEPT currently provides training services in process operations from entry level to advanced diploma and supports a growing number of electricians completing advanced trade qualifications in instrumentation. The proposed new centre will support the delivery of a wider range of qualifications focused on developing the high level technical skills required for the operation and maintenance of LNG plants.

The proposed new centre will increase ACEPT's capacity to train from 900 to an estimated 3000 graduates annually for the LNG and resource industries. A focus for the new centre will be programs for:

- plant supervisors and managers;
- engineering technicians at all levels and streams; and
- associated technical roles in the supply chain.

The new centre would provide facilities to deliver the following qualifications:

- Diploma and Advanced Diploma in Engineering (Mechanical)
- Diploma and Advanced Diploma in Engineering (Electrical / Electronic)
- Diploma and Advanced Diploma in Engineering (Instrumentation and Process Control)
- Diploma and Advanced Diploma in Engineering (Structural and Piping Design)
- Diploma and Advanced Diploma of Process Plant Technology (leading to jobs as mechanical maintenance engineers, maintenance supervisors, People in Charge (PIC) and shift supervisors).

The new centre will provide effective training strategies for up-skilling existing workers, gap training for tradespeople entering the oil and gas industry and new

entrants with targeted strategies for under-represented groups, such as women and Aboriginal people. The new centre's proposed technology infrastructure will support remote access for regional and remote students and complement a national training strategy for the oil and gas sector.

The estimated cost of the proposed new centre is $13.5 million. This includes services, car parking and external works.

A report produced by Pitcrew Management Consulting Services for APPEA considered the labour requirements over the next five years of 248 major resources, energy and infrastructure projects under construction or being planned for development across Western Australia, Northern Territory and Queensland and identified total capital expenditure for these projects at $527.1 billion, of which $318.3 billion has been approved.

Workforce demand for oil and gas projects **currently under construction, including construction, engineering and operations growth,** is expected to more than double by the second half of 2014 to 45,000.

Construction labour demand is forecast to increase from 49,000 at the start of 2012 to a peak of 95,000 during 2014. An acute shortage of welders, fitters and electricians is expected with demand exceeding labour availability by more than 50 per cent during 2014 and 2015. Moderate to high shortages are also expected to be experienced in many other occupations, including plant operators, carpenters, steel workers and construction and mining labourers.

Engineering demand is forecast to fluctuate between 20,000 and 25,000 until mid-2013 before peaking at 31,000 in late 2013. As more projects start production, the demand for operations labour will also increase. The additional operations workforce required by major resources and energy projects is forecast to increase from 16,000 in mid-2012 to 66,000 by the end of 2017.

The Department of Education, Employment & Workplace Relations (DEEWR, cited in AWPA 2012 Report on Resource Sector Skill Needs) estimates that **direct** employment in oil and gas extraction will rise by 11% per annum between 2011-12 and 2016-17, increasing employment in the industry from around 16,600 to 28,000 in 2017.

	Unique Students	Module Enrol	Total SCH	Unique Students	Module Enrol	Total SCH	Unique Students	Module Enrol	Total SCH	Unique Students	Module Enrol	Total SCH	Unique Students	Module Enrol	Total S
ss Plant Technology	4	46	2,413	4	38	2,007	5	34	1,600	8	11	500	9	80	4,(
	121	1,107	23,676	32	111	2,776	191	3,066	66,834	60	584	11,737	312	4,173	90,5
: Operations	91	1,319	32,155	67	522	13,289	19	19	390	5	35	888	110	1,338	32,5
- Electrical/Electronic Trade	47	219	6,876	62	284	7,973	0	0	0	0	0	0	47	219	6,8
- Mechanical Trade	160	973	25,513	116	1,019	27,314	1	36	906	0	0	0	161	1,009	26,4
- Technical	65	633	18,972	85	480	17,370	38	374	11,153	4	39	1,346	103	1,007	30,1
t Operations	61	582	18,093	145	1,202	36,577	50	592	18,335	94	957	27,878	111	1,174	36,4
	121	365	12,820	128	339	9,894	34	157	4,483	45	118	2,617	155	522	17,3
[Electrical Instrumentation]	76	380	13,929	48	326	11,323	0	0	0	0	0	0	76	380	13,9
[Instrumentation]	39	326	11,233	42	316	10,326	26	554	19,794	9	39	1,561	65	880	31,(
[Maintenance]	0	0	0	0	0	0	0	0	0	1	10	189	0	0	
t Technology	70	1,394	45,725	36	698	24,267	15	95	3,554	15	90	4,067	85	1,489	49,2
vanced Trade	14	130	3,718	10	30	670	0	0	0	1	3	114	14	130	3,7
chnical	53	536	23,046	1	3	148	1	1	40	0	0	0	54	537	23,(
chnology	9	70	3,434	8	57	2,657	1	10	521	8	18	981	10	80	3,9
TOTAL	931	8,080	241,603	784	5,425	166,591	381	4,938	127,610	250	1,904	51,878	1,312	13,018	369,2

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units/modules that students have enrolled in